Patent Claims

1. Method for populating and soldering a circuit board having a first side and a second side and at least one wired, electrical component ("THT-component") having at least one connection wire or connection pin and a housing or casing thermally critical for conventional, automatic soldering technology, characterized by the following method steps:

a) the THT-component is populated on the first side of the circuit board, with the connection wire or pin stuck from the first side through a hole and emerging on the second side of the circuit board in the area of a soldering contact surface printed with a solder paste; and

b) the circuit board populated in this way is sent into a reflow oven for the soldering, wherein the first side populated with the THT-component is at least partially, essentially shielded from a heat or energy feed effecting the soldering.

2. Method for populating and soldering a circuit board having a first side and a second side and at least one wired, electrical component ("THT-component") having at least one connection wire or connection pin and a housing or casing thermally critical for conventional, automatic soldering technology, characterized by the following method steps:

a) the THT-component is populated on the first side of the circuit board, with the connection wire or pin stuck from the first side through a hole and emerging on the second side of the circuit board in the area of a soldering contact surface printed with a solder paste; and

b) the circuit board populated in this way is sent into a reflow oven for the soldering, wherein the first side populated with the THT-component is thermally separated from the heat or energy feed acting on the second side of the circuit board for the soldering

and wherein, by suitable means, a temperature difference of at least 28 °C can be achieved between the first side and the second side.

3. Method as claimed in claim 1 or 2, wherein, for a populating of the second side of the circuit board with at least one SMD-component, solder paste is applied to solder contact surfaces provided therefor, and wherein, following populating of the second side of the circuit board with the SMD-component, this is soldered, together with the connection wire of the THT-component, in a process step in the reflow oven.

4. Method as claimed in one of the claims 1, 2 or 3, wherein also the first side of the circuit board is populated with at least one SMD-component.

5. Method as claimed in claim 4, which includes the following method steps:
a) printing of solder paste on the first side of the circuit board;
b) populating of the first side with SMD-components;
c) soldering the SMD-components of the first side in the reflow oven;
d) populating of the first side with at least one THT-component;
e) printing of solder paste on the second side;
f) populating the second side with SMD-components, and
g) soldering SMD-components of the second side and the one or more THT-components in the reflow oven.

6. Method as claimed in claim 5, wherein, before the printing of the solder paste on the second side of the circuit board, connection wires of the THT-components are dressed.

7. Method as claimed in claim 6, wherein the connection wires of the THT-components are clinched or bent in some other way, for example crimped, such that they clamp the one or more affected THT-components on the circuit board.

8. Method as claimed in claim 6, wherein the connection wires are shortened before the populating of the THT-components such that they extend only slightly from the circuit board after the populating.

9. Method as claimed in one of the claims 5 to 8, wherein, before the populating of the THT-components on the locations to be populated, adhesive for securing the THT-components on the circuit board is applied.

10. Method as claimed in claim 5, characterized in that, on the circuit board and/or on at least one of the THT-components, at least one securement aid is provided, which secures the affected THT-component mechanically on the circuit board following the populating.

11. Method as claimed in claim 10, characterized in that the securement aid includes a snap-in mechanism.

12. Method as claimed in claim 4, including the following method steps:
a) printing of solder paste on the first side;
b) applying adhesive on the locations of the first side which are to be populated with THT-components;
c) populating the first side with SMD-components;
d) populating the first side with THT-components;
e) soldering the SMD-components of the first side in the reflow oven;
f) printing solder paste on the second side;
g) populating the second side with SMD-components, and
h) soldering the components of the second side and the THT-components in the reflow oven.

13. Method as claimed in claim 12, wherein, before the printing of the solder paste on the second side, connection wires of the THT-components are so dressed that they do not protrude beyond the surface of the circuit board.

14. Method as claimed in one of the preceding claims 1 to 13, characterized in that at least one of the sides of the circuit board is populated with at least one pin-in-hole component (PIH-component).

15. Method as claimed in one of the preceding claims 1 to 14, characterized in that the first side of the circuit board populated with the one or more THT-components is shielded, respectively thermally separated, in the reflow oven essentially by the circuit board itself from the heat or energy feed acting on the second side for the soldering.

16. Method as claimed in claim 15, characterized in that, in the case of an essentially horizontal arrangement of the circuit board during travel through the reflow oven for the soldering of the THT-components or the THT-component, these or this, as the case may be, are located underneath the circuit board.

17. Method as claimed in one of the preceding claims 1 to 16, characterized in that the first side of the circuit board populated with the one or more THT-components is cooled in the reflow oven.

18. Method as claimed in one of the preceding claims 1 to 17, characterized in that, in the reflow oven, those areas of the circuit board, which have a tendency, because of a circuit board layout, to have an above-average take-up of heat energy, are covered with a covering that blocks or delays the uptake of heat energy.

19. Method as claimed in claim 18, characterized in that the covering is made of a non-metallic material.

20. Method as claimed in one of the preceding claims 1 to 17, characterized in that, for the case, where an above-average heating by the heat or energy feed effecting the soldering in the reflow oven is desired in a region of the circuit board, this

region of the circuit board is covered with a covering improving a heat energy uptake.

21. Method as claimed in claim 20, characterized in that the covering is made of a metallic material.

22. Reflow oven for soldering a circuit board having a first side and a second side and at least one wired, electrical component ("THT-component") having at least one connection wire or connection pin and a housing or casing thermally critical for conventional, automatic soldering technology, characterized in that the first side of the circuit board populated with the THT-component is shielded during the soldering, in the area of a solder contact surface printed with a solder paste, from a heat or energy feed effecting the soldering of the connection wire of the THT-component emerging at said surface.

23. Reflow oven for soldering a circuit board having a first side and a second side and at least one wired, electrical component ("THT-component") having at least one connection wire or connection pin and a housing or casing thermally critical for conventional, automatic soldering technology, characterized in that the first side of the circuit board populated with the THT-component is thermally separated during the soldering, in the area of a solder contact surface printed with a solder paste, from a heat or energy feed effecting the soldering of the connection wire of the THT-component emerging at said surface and wherein a temperature difference between the first and second sides of at least 28 °C is achievable by suitable means.

24. Reflow oven as claimed in one of the claims 22 or 23, characterized in that the circuit board is arranged such that, during its transport through the reflow oven, the first side of the circuit board populated with the one or more THT-components is shielded, respectively thermally separated, essentially by the circuit board itself from the heat or energy feed acting on the second side of the circuit board for the soldering.

25. Reflow oven as claimed in one of the claims 22 or 23, characterized in that a cooling apparatus is provided therein, by means of which the side of the circuit board populated with the one or more THT-components is cooled during the soldering operation.

26. Reflow oven as claimed in one of the claims 19 to 21, characterized in that it has at least one infrared radiation source, which delivers heat energy effecting the soldering.

27. Circuit board for a method as claimed in one of the claims 1 to 17, characterized in that it is so designed, respectively executed, that it makes possible locally pre-determinable areas of above-average heat energy uptake in the case of heat energy acting externally onto the circuit board.

28. Circuit board as claimed in claim 27, characterized in that an above-average amount of copper is provided in the areas with desired above-average heat energy uptake.

29. Circuit board for a method, as claimed in claim 27, characterized in that it is a multi-layer circuit board having at least one inner layer, which is so designed, respectively executed, that, in the areas of desired, above-average heat energy uptake, there is, in each case, a large-area, metallic and/or electrically conducting part.

30. Circuit board for a method as claimed in one of the claims 1 to 17, characterized in that it is designed, respectively executed, such that a below-average copper portion is provided in the areas where a below-average heat energy uptake is desired.